

# Focus on Research

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## Update on NHDOT Research: New Projects Underway

### *Recent UAS Project builds on Completed Research*

NHDOT is preparing for the integration of Unmanned Aircraft Systems (UAS) into transportation management. An initial project, completed by University of Vermont in June 2019, evaluated the use of UAS and the potential benefits. Focus areas included traffic and construction monitoring, bridge and rock slope inspection, and emergency management. More information on this completed project is available at:

<https://www.nh.gov/dot/org/projectdevelopment/materials/research/projects/26962j.htm>

In order to implement this technology, a UAS Program Plan is needed. A second UAS-focused research project is expected to kick off in August 2020 that will result in a UAS program plan that will outline the necessary organizational structure, internal policy, data-related needs, and safety considerations. Visit this site for more information:

<https://www.nh.gov/dot/org/projectdevelopment/materials/research/projects/42372b.htm>



**Aerial photo to monitor overflow parking at Franconia Notch State Park**

### *Using Data Analytics to Forecast NH Bridge Condition*

NHDOT is working in partnership with the University of New Hampshire (UNH) to develop state-specific deterioration curves based on collected bridge condition data and maintenance records. The results will be used to evaluate the service life extension associated with bridge maintenance and how well the timing of the activities adhere to the Recommended Investment Schedules (RIS).



**Piscataqua River Bridge, Portsmouth, NH (Source: Wikipedia)**

For more information on this timely and on-going research project, visit:

<https://www.nh.gov/dot/org/projectdevelopment/materials/research/>

***NHDOT partners with UNH to Complete Research******Research Focused on NH Pavement Challenges***

UNH wrapped up two pavement-related research projects, culminating two years of research. This research explores ways to improve pavement design and materials.

***Layer Coefficients for NHDOT Pavement Design***

The characteristics of asphalt mixtures currently used were evaluated to determine if the historic layer coefficient values for used in New Hampshire pavement design are accurate. Final report:

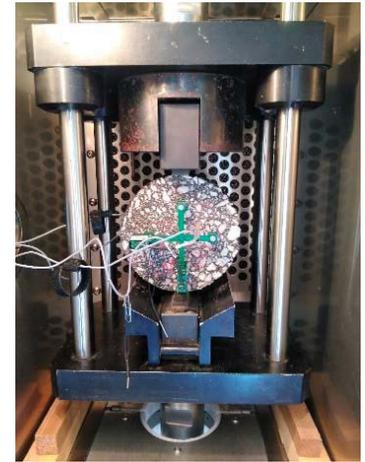
[https://www.nh.gov/dot/org/projectdevelopment/materials/research/projects/documents/26962n\\_report.pdf](https://www.nh.gov/dot/org/projectdevelopment/materials/research/projects/documents/26962n_report.pdf)

***Incorporating Impact of Binder Aging on Cracking Performance of Asphalt Mixtures during Design***

Traditional NHDOT binders and mixtures were evaluated with respect to aging and cracking performance over time. Guidance was developed to support material selection and mixture design. Final report:

[https://www.nh.gov/dot/org/projectdevelopment/materials/research/projects/documents/26962o\\_report.pdf](https://www.nh.gov/dot/org/projectdevelopment/materials/research/projects/documents/26962o_report.pdf)

**UNH Principal Investigators:** Jo Sias and Eshan Dave



Resilient modulus test



**University of  
New Hampshire**

College of Engineering  
and Physical Sciences

***Early-age Bridge Curb Cracking Examined***

This project investigated the cause of early-age cracking on newly constructed bridge curbs. Focusing on single-span concrete bridges, seventeen existing and eight newly constructed bridge curbs were surveyed, inspected, and analyzed. As an example, one curb was built using the NHDOT Bureau of Bridge Maintenance (BoBM) standard



Concrete bridge curb, NH 113 in Grantham

construction procedures and mix as a control with the opposing curb built with a variable such as the construction practice or mix design.

Crack length and intensity indices were combined with crack location/spacing to produce a curb cracking index that represented the quality of the curb. Results indicated that longer wet cure durations and lower cementitious content mixes reduce bridge curb cracking. Final report:

<https://www.nh.gov/dot/org/projectdevelopment/materials/research/projects/documents/26962p-report.pdf>

**UNH Principal Investigator:** Eshan Dave

**Accelerated Innovative Deployment (AID) Grant for Dover, NH**

In 2018, FHWA awarded Dover, NH, an AID grant to implement a number of Automated Traffic Signal Performance Measures (ATSPMs) that will help improve efficiency, safety, air quality, and mobility.



January 2020 marked the completion of the “pre-construction” phase of their project. Since then, they have installed new traffic controllers, vehicle detection cameras, and pedestrian pushbuttons at several existing intersections. In the coming weeks, over 4,500 feet of existing copper interconnect wire will be replaced with fiber optic cabling. This will improve street-level signal interconnections associated with three



View from traffic camera at Central Avenue and Old Rollinsford

separate coordinated signal systems. In addition, new street-level wireless communication devices and tower antennas will upgrade the City’s existing network for traffic signal communications. Presently, separate Bluetooth and Wi-Fi based technologies are being field tested for measuring corridor travel times. By late summer, the field equipment and special platform software, to actively manage Dover’s 34 traffic signals, will be operational.

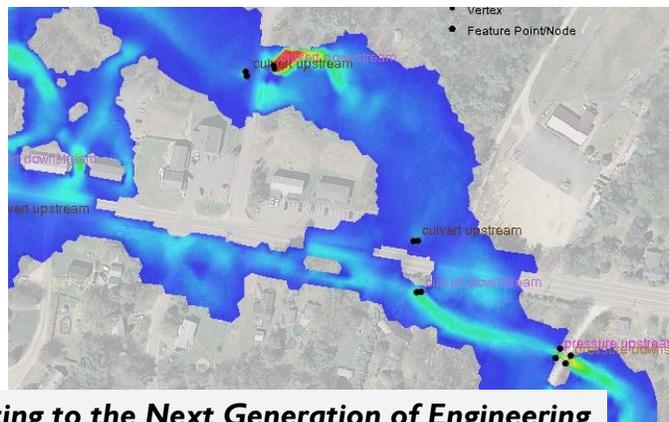
**Every Day Counts (EDC) Round 5 Update**



**Virtual Public Involvement:** Although the Department has used its website to post information about the 10-Year Plan, this year the public had access to user-friendly features. A short introductory video, transcribed presentation, and online survey allowed the public to participate in the comfort of their homes.



Ten Year Plan Video Script



**Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE):** SRH 2d model of US 4 in Barrington that includes a bridge over Oyster River, a private historic driveway bridge, and two culverts.

INNOVATIVE INITIATIVES

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*“Change is  
the law of life.  
And those who  
look only to the  
past or present  
are certain to  
miss the  
future.”*

John F. Kennedy  
(1917-1963)  
35th US President

New Hampshire  
**DOT**  
Department of Transportation

**NH Partners in Research****New England Transportation Consortium (NETC)**

NETC is a research cooperative between the state transportation agencies of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Resources and expertise are pooled for projects of regional concern to address the needs of the New England states. Evaluation of the 2020 research problem statements resulted in selection of the following projects:

- **NETC 20-1**, *In-Service Performance Evaluation of NETC Bridge Railings*
- **NETC 20-2**, *Current Status of Transportation Data Analytics and A Pilot Case Study Using Artificial Intelligence (AI)*
- **NETC 20-3**, *Investigating Thermal Imaging Technologies and Unmanned Aerial Vehicles (UAV) to Improve Bridge Inspections*
- **NETC 20-4**, *New England Connected and Automated Vehicle Legal and Regulatory Assessment*

More information on NETC, these upcoming projects, ongoing or completed research efforts, and related webinars is available at:

<https://www.newenglandtransportationconsortium.org/>

**US DOT Region 1 (New England) University Transportation Center**

In 2018, the University of Maine became Region 1's University Transportation Center (UTC). The US DOT invests in the future of transportation through its UTC Program. This Congressionally-mandated program has been in place since 1987 to address our need for safe, efficient, and environmentally sound movement of people and goods. Our Region's UTC includes six member universities that have a mission to improve the durability and extend the lifespan of existing and new transportation assets. Focused on four (4) research thrust areas, it is committed to make dramatic impacts in the cost-effectiveness of transportation infrastructure through 1) assessment and health monitoring, 2) innovative materials, 3) advanced systems, and 4) enhanced asset and performance measurement.



More information: <https://www.tidc-utc.org/>

**NHDOT Research Section Website:**

<https://www.nh.gov/dot/org/projectdevelopment/materials/research/index.htm>